

Vol. 35

October 1989

No. 2

REORGANIZATION OF THE DIVISION OF MINERAL RESOURCES

The Department of Mines, Minerals and Energy's Division of Mineral Resources was reorganized in March, 1989, to reflect the ever increasing needs of the Commonwealth for geological information and services and to improve the Division's capability to fulfill and deliver those needs and services. In general, the reorganization improves the internal operations of the Division without a substantive change in the scope of its activities.

Prior to the reorganization, the Division operated with an administrative section composed of three Geology Program Supervisors, the Deputy, and a secretarial pool. This arrangement was decentralized and two branches were created, with a Geology Program Supervisor in charge of each. The geology Program Supervisor's position occupied by Don Le Van prior to his retirement will not be filled at that level.

Currently, Stan Johnson is the head of the newly formed Geological Investigations Branch, which contains the Economic Section, Applied Geology Section, Geologic Mapping Section, and Southwestern Field Operations Section (see organizational chart). Dick DeKay heads the Geological Support Branch, which contains the Information Services and Publication Section, an Office Services Supervisor Senior, and the Analytical Chemist. The Division's Publication efforts have been enhanced by the addition of a desk-top publishing unit.

Thus organized, the Division encourages the maximum amount of participation of its employees in program planning and in its daily internal operations. Annual strategic and operational planning sessions are held at the Departmental and Divisional levels, respectively, allowing for employee input at all levels. Equipment needs are identified by the staff and are routed upward for review and final approval. In short,

the Division's employees participate together as a team in the fulfillment of Departmental and Divisional goals and objectives.

Information may be obtained by contacting any of the staff geologists informally or, more formally, by contacting the State Geologist, Deputy, and/or Geology Program Supervisors. The Sales Office should be contacted directly for the purchase of topographic maps and geological publications, and the library may be accessed for its wide variety of geological and topographic materials. The address of the Division is P.O. Box 3667, Charlottesville, VA 22903. The telephone number is: 804-293-5121.

REFLECTIONS

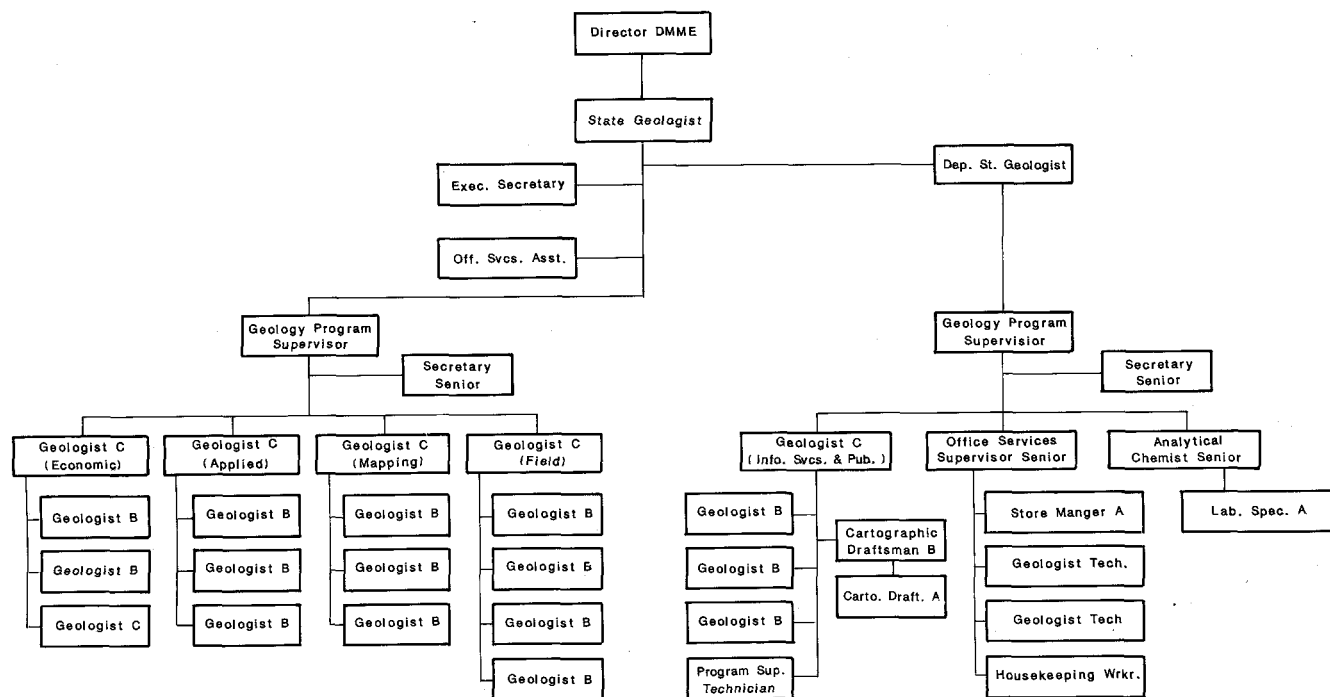
"Words that begin with the letter 'p' are causing serious fiscal problems in many states and the nation; others 'p' words may be part of their solution. Increasing **population** is requiring more land, water, minerals, and energy. More people are causing more **pollution** and requiring additional services and facilities such as **physicians** and health care, **prisons**, and many others. Revenues are not sufficient to **pay** for all their needed services. Tax increases are not currently being considered as acceptable ways to generate additional revenues.

What, then, is the solution? In Arizona, government agencies are being asked to cut costs, operate more efficiently, improve **performance**, and be more **productive**. This will require that they clearly define or redefine what services, **products**, and activities are essential, and develop strategic **plans**, goals, and **priorities** to provide them.

Most state geological surveys communicate regu-

DEPARTMENT OF MINES, MINERALS & ENERGY

Division of Mineral Resources



larly with those who use our products and services. Constituents consistently tell us that, first of all, they need to know what geologic reports, maps, and data are available. Up-to-date bibliographies and computerized data bases are usually mentioned. Secondly, they need accurate, detail maps of bedrock and surficial geology. Finally, they request a variety of scientific, objective, topical and interpretive reports and maps, many of which are based on, or derived from, detailed geologic maps.

During the past 10 years, discussions at AASG meetings, reflecting the expressed data needs of constituents, have increasingly focused on basic geologic data and maps. This year AASG members united in their support of a **National Geologic Mapping Program**. Substantial progress has been made already on national topographic mapping and soils mapping programs, both of which required long-term commitment, goals, plans, priority, personnel, and funding. A National Geologic Mapping Program must now be given similar commitment and priority. I encourage AASG members to continue to work together in stressing the importance of this program to the Nation.”¹

Larry D. Fellows
State Geologist of Arizona

¹ Quoted from American Association of State Geologists Journal, v. 41, 1989.

PLANNING AND SERVICE

Over the last several administrations, the Commonwealth has increased its efforts to improve the quality of state service by better management of state agencies. To this purpose the Department of Mines, Minerals and Energy creates a strategic plan each year, which outlines broad goals, objectives, and strategies for the agency. In turn, each of the Department's seven divisions develop their own operational plans, which are based upon the strategic plan. The agency monitors and evaluates the progress on the plan periodically in order to ensure that established goals and objectives are met and that appropriate mid-course corrections are made.

This year the Division of Mineral Resources' plan consists of two goals. The first goal provides for public service, expansion of the geologic database, development of energy/mineral resources in an environmentally sound manner, and an increase of client use of the Division's products and services. The second goal relates to improving the Division's use of personnel and operational resources, and improving communications and financial practices. The Division's research and support branches and sections subsequently develop their own operational plans to implement the planned work of the Division of Mineral Resources for

geological and mineral resource studies in the Commonwealth.

The following is the Division of Mineral Resources operational plan for Fiscal Year 1990.

DIVISION OF MINERAL RESOURCES OPERATIONAL PLAN FY 90

GOAL

1.00.00 Enhance the wise use of mineral, land, energy, and water resources.

OBJECTIVE

1.01.00 To increase client understanding of Virginia geology and its relationship to mineral, land, energy, and water resources and the environment through June 30, 1990.

STRATEGY

1.01.01 Geologic Support Branch will maintain the Sales Office in Charlottesville to respond to client requests for existing maps, reports, and brochures.

1.01.02 DMR staff will respond to all requests for geologic and topographic information, services, and studies from industry, the public, governmental agencies, professional organizations, and educational groups.

1.01.03 Information Services and Publication Section will publish or open-file reports, articles, and various quadrangle and derivative maps for client use.

1.01.04 Information Services and Publication Section will maintain the library to serve clients and the DMR staff.

1.01.05 DMR staff geologists will participate, as requested, in advisory committees involved in energy and mineral development and environmental concerns.

1.01.06 DMR staff geologists will complete presentations and field trips for the 28th International Geologic Congress by August 1, 1989.

1.01.07 Information Services and Publication Section will distribute topographic map products and at least 200 copies of each new publication to libraries, planning districts, appropriate state agencies, and selected out-of-state clients.

1.01.08 Branch managers will investigate DMR client complaints within 5 working days; the State Geologist will be advised of all client complaints promptly; if appropriate, DMR will communicate and coordinate with other affected and interested divisions.

OBJECTIVE

1.02.00 To expand the geological, energy and mineral resources, and environmental data base of Virginia through June 30, 1990.

STRATEGY

1.02.01 DMR staff geologists will complete the GEOHY project field work by July 31, 1989 and reports by November 1, 1989. Printing will continue as funds are available.

1.02.02 Geologic Research Branch Manager, in consultation with the State Geologist, through the Director in cooperation with the appropriate government agencies and in consideration of the report on recommendations for future geologic mapping, will select an area and initiate a pilot study by September 1, 1989 to produce an applied geology report. Prior to the beginning of the study, visits will be made to local government officials in the area. These visits are a market initiative and will require interactive discussions to identify client needs that DMR might fulfill. Branch personnel will be assigned, as appropriate, to perform the project.

1.02.03 Geologic Research Branch Manager and the State Geologist through the Director and in cooperation with the State Health Department, will plan a program of radon research by September 1, 1989.

1.02.04 Mapping, Field, and Applied Geology Sections will continue the State Geologic Map Project.

1.02.05 DMR branch managers will supervise the maintenance and additions to the repositories for core and well samples, rocks, minerals, and fossils.

1.02.06 Information Services and Publication Section will maintain the seismic station and provide seismic related information to the public.

OBJECTIVE

1.03.00 To foster the economic development of energy and mineral resources in an environmentally sound manner through June 30, 1990.

STRATEGY

1.03.01 Geologic Research Branch will complete, through section review, studies on industrial minerals, fossil fuels, and metallic minerals.

1.03.02 DMR staff geologists will maintain liaison with the mineral industry; the Economic Geology Section will complete, through section review, a directory of the mineral industry in Virginia by September 30, 1989.

1.03.03 Geologic Mapping Section, operating the field office in Williamsburg, in cooperation with the Virginia Institute of Marine Science, will continue work on the Year-5 MMS project through December 31, 1989. DMR Administration will continue to pursue the Year-6 MMS and Year-7 MMS projects through June 30, 1990.

1.03.04 Information Services and Publication Section will request that DGO, DMLR, DMM, and DM present a seminar on pertinent laws, regulations, and enforcement procedures to the DMR staff before June 30, 1990.

1.03.05 Geologic Research Branch will sponsor an industrial minerals forum to promote mineral-resources exploration and development of Virginia by May 31, 1990.

1.03.06 Economic Geology Section in cooperation with the DMR staff will continue to update records of oil and gas wells, industrial minerals sites, and metallic mines; the Economic Geology Section will make this data available upon request to DGO and DMM.

1.03.07 Geologic Research Branch Manager will select a DMR staff member by May 15, 1989, to participate in a study of the feasibility of developing a plan to market Virginia's mineral and fossil fuel resources, coordinated by the Division of Energy.

1.03.08 State Geologist will submit to the Director an outline of any proposed economic development initiative for review and coordination with other Division's activities.

1.03.09 DMR staff will respond to the Office of Policy Analysis in monitoring, identifying, and implementing changes in government regulations and laws.

1.03.10 DMR staff will identify appropriate energy and mineral related issues and will provide information and recommendations to the Office of Policy Analysis for coordinated responses.

OBJECTIVE

1.04.00 To increase client use of DMR products and services pertaining to geology, energy and mineral resources, topographic mapping, and the environment through June 30, 1990.

STRATEGY

1.04.01 Information Services and Publication Section, with the assistance of the DMR staff, will identify client groups from a review of current newspaper articles and other media communications and from client requests made through telephone, mail, office visit, and meeting contacts. The Section will submit a written report of their findings to the State Geologist by May 1, 1990.

1.04.02 DMR staff geologists will make presentations and provide exhibits to inform governmental, educational and professional organizations on Virginia geology, mineral resources and environmental protection, as well as the products and services offered by DMR.

1.04.03 Information Services and Publication Section will assist the Department's Information Officer to prepare and staff an exhibit for the Virginia State Fair.

1.04.04 Each geologic branch will prepare and distribute pamphlets, brochures, and fliers on various aspects of geology, mineral resources, and the environment and of DMR services and products.

1.04.05 Information Services and Publication Section will respond to the Department's Information Officer to develop and manage communications and public relations to foster a positive agency image.

1.04.06 The Operational Team will determine whether to continue and/or reformat of "Virginia Minerals" by September 1, 1989.

1.04.07 Information Services and Publication Section will continue to provide an updated "List of Publications and Maps."

1.04.08 Information Services and Publication Section will continue to update and maintain a client mailing list.

1.04.09 Information Services and Publication Section will coordinate the periodic revision of 1:24,000 scale topographic maps and preparation of other map products by U.S. Geological Survey.

GOAL NO. 2

2.00.00 Improve the effective and efficient management of DMR resources.

OBJECTIVE

2.01.00 To improve development of DMR personnel resources through June 30, 1990.

STRATEGY

2.01.01 Geologic Research Branch Manager in consultation with the State Geologist will re-evaluate staffing levels and location of field offices relative to the report on recommendations for future geologic mapping and to future research needs, and make recommendations for redistribution of personnel resources by September 1, 1989.

2.01.02 DMR staff will attend conferences, meetings, seminars, field trips, short courses, and workshops in geology, mineral resources studies, and administration.

2.01.03 DMR staff will coordinate with the Office of Human Resources to implement personnel practices training and to continue employee development training to enhance Division operations.

2.01.04 Geologic Support Branch Manager shall notify staff of available State educational and training courses.

2.01.05 Information Services and Publication Section will continue to coordinate the DMR Employee Recognition Program and will work with the Office of Human Resources on the Department's Outstanding Employee of the Year Award.

2.01.06 DMR branch managers will continue to enhance safety awareness and select a representative from their respective branches by August 31, 1989 to plan and present an annual safety seminar before June 30, 1990.

OBJECTIVE

2.02.00 To ensure regular and timely communications through June 30, 1990.

STRATEGY

2.02.01 In order to enhance the flow of information and more effective communication within DMR the Division will continue the following:

- a. all sections will meet at least quarterly to coordinate their internal operations.
- b. Geologic Research Branch will hold an annual project re-

view during the November 1989 - January 1990 period which will be open to the DMR staff.

c. The Director shall be invited to address the DMR staff during FY '90.

2.02.02 Geologic Support Branch Manager shall notify staff of all procedural changes in a timely manner.

2.02.03 DMR will provide a representative to serve as a central contact and member of the Department's Internal Computer Users Group.

2.02.04 State Geologist will invite representatives from other divisions to discuss their activities in order to open lines of communications with DMR personnel.

2.02.05 DMR will describe and explain the Strategic Plan as it relates to the DMR Operational Plan '90 and will make available copies of other divisional plans to its own staff by September 30, 1989.

OBJECTIVE

2.03.00 To acquire and provide necessary physical resources within DMR through June 30, 1990.

STRATEGY

2.03.01 Geologic Support Branch Manager will oversee building maintenance and vehicle replacement.

2.03.02 DMR branch managers will coordinate with the Office of General Services in the procurement of physical resources and services to implement and maintain DMR operations; DMR will submit its 1990 equipment plan to the Director for approval.

2.03.03 DMR branch managers will evaluate field office space requirements and make recommendations to the State Geologist by September 1, 1989.

2.03.04 Geologic Support Branch Manager will continue to pursue acquisition of storage space.

2.03.05 Geologic Support Branch Manager, with assistance as appropriate, will compile and submit to the Office of General Services requests to sell/discard surplus property by December 31, 1989.

2.03.06 Geologic Support Branch Manager, with assistance of the staff and the Office of General Services, will make an evaluation plan for retention/discard of DMR office equipment by December 31, 1989.

2.03.07 Geologic Support Branch Manager will assist the Office of General Services to develop a plan for coordination of general service functions by February 1, 1990 and to implement the plan before June 30, 1990.

2.03.08 Geologic Support Branch will coordinate DMR participation with the Office of Management Information Systems to evaluate hardware and software life cycles and recommend replacement schedules and funding requirements.

2.03.09 State Geologist will appoint a staff member to develop procedures for the efficient relocation of DMR operations and services to new facilities.

2.03.10 DMR staff will coordinate with the Office of General Services to develop and implement their policies and procedures for procurement, capital outlay projects, risk management, property management, inventory control, fleet management, building and facilities, and radio communications.

OBJECTIVE

2.04.00 To coordinate and improve financial management practices through June 30, 1990.

STRATEGY

2.04.01 DMR staff will coordinate with the Office of Financial Services in the development and submission of the budget of the 1990-92 Biennium by September 30, 1989.

2.04.02 DMR staff will encourage the general acceptance of direct deposit for payroll checks.

2.04.03 DMR staff will assist the Office of Financial Services to review the Division indirect cost allocations.

2.04.04 DMR staff will develop its budget operating expenditure plan for FY 91 in coordination with the Office of Financial Services.

2.04.05 DMR staff will coordinate with the Office of Financial Services in the further "QS" and Query training for Division personnel.

2.04.06 DMR staff will assist the Internal Auditor in developing a plan to document DMR operating systems and procedures.

2.04.07 DMR staff will assist the Internal Auditor during audits of Department operations.

OBJECTIVE

2.05.00 To implement strategic planning within DMR through June 30, 1990.

STRATEGY

2.05.01 DMR Operational Plan '90 will be submitted by May 17, 1989 to the strategic team for approval.

2.05.02 DMR will implement its Operational Plan 1990 by circulating the approved plan to each of its staff members by August 15, 1989, contingent upon approval by the Strategic Team.

2.05.03 The DMR Operational Team, composed of the State Geologist, Deputy State Geologist, branch managers, and section heads, shall meet monthly to review progress on DMR Operational Plan '90; interested staff members may attend.

2.05.04 The DMR Operational Team may modify the Operational Plan in the following manner:

- a. maintain objectives by taking corrective actions first on strategies.
- b. obtain Strategic Team approval for changes of goals and objectives.
- c. alter plan because of unanticipated client events.

2.05.05 DMR staff will coordinate with the Office of Policy Analysis to participate in program evaluation training and in development of program measures.

2.05.06 The DMR Operational Plan '90 shall be evaluated and reviewed subsequent to the renewal of the Strategic Plan.

DIVISION NOTES

IGC International Meeting

The 28th International Geological Congress met in Washington D.C. in July. The last time the Congress met in the United States was 1933. Several of the Division of Mineral Resources' staff played an active part in this event. Staff members who prepared and participated in field trips were Robert Milici, James Conley, Eugene Rader, Nickolas Evans, Tom Gathright, and Roy Sites. Staff members also manned the Department of Mines, Minerals and Energy's exhibit booth at the Congress. Yingxin Zhou presented a paper on, "Evaluating impact of mining underlying seam on recoverable coal reserves in overlying seam." Yingxin, who received his Ph.D. in Mining Engineering at Virginia Tech, was employed as a Division staff member and worked in coal resources studies.

GEOHY Project

The Division of Mineral Resources completed the geologic mapping of the Southwestern coalfields on July 31, 1989. The four-year mapping program was a cooperative project between the Department of Mines, Minerals and Energy and the U.S. Department of the Interior, Office of Surface Mining. The project included studies of the geology and hydrology. The Division of Mineral Resources was responsible for the geologic aspects of the program. The U.S. Geological Survey conducted the hydrologic studies in the coalfields. The Division of Mined Land Reclamation developed a computer data base system for geology and hydrology especially as pertains to reclamation of surface mines.

Division geologists mapped all or parts of 24 7.5-minute quadrangles for the project. Eleven of these maps have been published to date. A comprehensive report currently is being prepared and will contain discussions of the geologic structure, stratigraphy, coal bed correlations, natural hazards, and history of the Southwest Virginia coalfields. Publication of this report is scheduled for 1990. When printing is completed, the Southwest Virginia coalfields will have full color geologic map coverage at a scale of 1:24,000.

Alfred Taylor and Robert Diffenbach are two of the

geologists who left the Division at the end of the project on July 31. Al and Bob, with their past experience and expertise, contributed greatly to the overall understanding of the geology in the project area. The Division was fortunate to have been able to obtain their services.



1989 Employee of the Year Award

Ms. Paige Roach, manager of the Division's sales office, won the Division's Employee of the Year Award. Paige was voted this honor because she successfully revitalized the entire sales operation. She has done an outstanding job in response to the many over-the-counter and mail-order sales and telephone inquiries that the Division receives daily. During the past year, she sold over 17,000 maps and publications to more than 3,000 clients. In addition, she responded to nearly 1,300 inquiries regarding sales office products and procedures.

Field Excursion

Several of the staff spent two days in the Appalachian Valley and Ridge in August on a mineral resource-oriented field trip at the old Fenwick iron mine and the surrounding area in Craig and Botetourt counties. Mike Linden, U.S. Forest Service, led the geological field trip to the mines and reviewed some of the local geology in Alleghany County. Tom Gathright reviewed aspects of the geology and structure in Botetourt County near Eagle Rock and in the Covington area. Before returning to Charlottesville, visits were made to the Barger Quarry in Lexington and to the Lone

Jack Quarry in Glasgow. Charles Barger, Jr. briefed the group on his quarry operation and uses of the stone. He discussed his company's plans to develop part of the quarry site as a shopping center.

Natural Resources Building

Visitors to the Mineral Resources' area of the Natural Resources Building will note several changes to the building. All of the old "asbestos board" walls have been removed, walls have been shifted to increase usable space, and carpet and new electric wiring have been installed. In preparation for a move to a planned new building, old furniture is being replaced. The building is definitely taking on a "new look".

REPRINTED STATE MAPS NOW AVAILABLE

The 1973 State topographic and planimetric maps have been reprinted and are available at the Division for \$4.00 each plus tax. The 30 x 64-inch multicolor map is at a scale of 1:500,000 or 1 inch equals approximately 8 miles. Please add \$1.00 for shipping if ordering by mail.

NEW TOPOGRAPHIC MAPS

The Washington 1° x 2° topographic map has been revised with a new format. The map, with a contour interval of 20 meters, is approximately 24 x 36 inches at a scale of 1:250,000 or 1 inch equals 4 miles.

Three 1:100,000-scale maps, previously published in planimetric editions, are now available with topography (contour interval 20 meters). The Charlottesville, Front Royal, and Winchester maps are part of this intermediate-scale series.

New topographic maps for Henry and Prince William counties have been produced by the U.S. Geological Survey, under a cooperative program with the Division of Mineral Resources, at a scale of 1:50,000.

The 1:250,000-, 1:100,000-, and 1:50,000-scale maps are available from the Division for \$4.00 each plus \$0.18 State sales tax to Virginia addresses and \$1.00 for mailing charges on orders under \$10.00.

FIELD TRIPS AND CONFERENCES

October 1989

Oct. 24-27 Eastern Region, Society of Petroleum Engineers, mtg., Morgantown, W.Va. Sally Goldesberry, Society of Petroleum Engineers, P.O. Box 833836, Richardson, TX 75083-3836. Phone 214/669-3377.

November 1989

Nov. 6-8 Ground-water and well technology short course, Columbus, Ohio. National Water Well Association, 6375 Riverside Drive, Dublin, OH 43017. Phone 614/761-1711.

Nov. 6-9 Geological Society of America, ann. mtg., St. Louis. Vanessa George, GSA, P.O. Box 9140, Boulder, CO 80301. Phone: 303/447-2020.

Nov. 9-10 Coalbed methane special institute, Nashville, TN. Richard A. Counts, Program Chmn., Counts and Associates. Eastern Mineral Law Foundation, West Virginia University, Law Center, P.O. Box 6130, Morgantown, WV 26506-6130. Phone: 304/293-2470.

Nov. 14-16 Exclusive economic zone, symposium, Reston, VA. USGS-NOAA Joint Office for Mapping and Research, 915 National Center, Reston, VA 22092. Phone: 703/648-6525.

Nov. 15-17 Eastern oil shale, symposium, Lexington, KY. Geaunita H. Caylor, University of Kentucky, 201 Porter Building, Lexington, KY 40506-0205. Phone: 606/257-2820.

December 1989

Dec. 4-8 American Geophysical Union, fall mtg., San Francisco. AGU Meetings, 2000 Florida Ave. N.W., Washington, D.C. 20009. Phone 202/462-6903.

Dec. 8 Subsidence special institute, Pittsburgh, PA. J. Thomas Lane, Program Chmn., Bowles Rice McDavid Graff & Love. Eastern Mineral Law Foundation, West Virginia University, Law Center, P.O. Box 6130, Morgantown, WV 26506-6130. Phone: 304/293-2470.

February 1990

Feb. 20-22 Society of Exploration Geophysicists, mtg., New Orleans, LA. SEG, P.O. Box 702740, Tulsa, OK 74170-2740. Phone: 918/493-3516.

May 1990

May 13-18 '90 Forum on the Geology of Industrial Minerals, annual meeting, technical sessions, and field trips, Charlottesville, VA. Gen. Chmn. Palmer C. Sweet, Virginia Division of Mineral Resources, P.O. Box 3667, Charlottesville, VA 22903. Phone: 804/293-5121. Industrial Minerals in the Middle Atlantic States. Papers invited. Abstract deadline: January 31, 1990.

June 1990

June 3-6 AAPG Annual Meeting (with SEPM, EMD, and DPA), San Francisco, CA. Gen. Chmn. James R. Baroffio, Chevron USA Inc., 575 Market St., San Francisco, CA 94105. Phone: 415/894-1170.

September 1990

Sept. 10-12 AAPG Eastern Section, London, Ontario, Canada. Gen. Chmn. Robert A. Trevaill, 926 William Street, London, Ontario, Canada N5Y2S6.

Postmaster
Send address corrections to -
Virginia Division of Mineral Resources
P.O. Box 3667
Charlottesville, VA 22903

Virginia Minerals
Second-class postage paid at
Charlottesville, Virginia
ISSN 0042-6652

RECENTLY RELEASED PUBLICATION OF THE DIVISION OF MINERAL RESOURCES

Wilkes, Gerald P., Johnson, Stanley S., and Milici, Robert C., 1989, Exposed and inferred Early Mesozoic basins onshore and offshore, Virginia: Publication 94, 2 maps, limited color, 1:500,000, \$6.50.

In Virginia, the Atlantic Coast rift system of Early Mesozoic age is exposed in the Piedmont and concealed beneath the Coastal Plain. All of the exposed basins are generally parallel with the regional trend of the Appalachian orogen. The areal extent of basins east of the Fall Line is not known in detail. The approximate distribution of those buried basins has been deduced from drill holes (shown on the maps) supplemented by geophysical data. (Aeromagnetic data is shown on Plate 1 and gravity data on Plate 2.) The exposed Richmond basin and the exposed part of the Taylorsville basin are on trend with drill holes in the Coastal Plain of Virginia and Maryland that have penetrated rocks of probable Early Mesozoic age. This trend may be continuous into the Delmarva Peninsula as a belt of buried rift basins. Offshore Virginia rift basins have been identified on the basis of seismic reflection profiles. One of the identified basins is about 75 miles offshore of Southeast Virginia and is probably divided into two separate basins by a horst-like structure of basement rocks.

Copyright 1989, Commonwealth of Virginia

Virginia Minerals, Vol. 35, No. 1, October 1989